ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for August, 1891, as determined from observations taken daily at 8 a. m, and 8 p. m. (75th meridian time), is shown on Chart II by isobars. The mean pressure was highest along the south Atlantic coast and over the Florida Peninsula, where it was above 30.05, and it was above 30.00 along the immediate Pacific coast north of the 40th parallel. The mean pressure was lowest over the San Joaquin Valley, California, where it fell below 29.85; it was below 29.90 over the greater part of the southern plateau region and the eastern half of California; and was below 29.95 from the Gulf of Saint Lawrence westward along the northern border of the country to northeast Washington.

A comparison of the pressure chart for August, 1891, with that of the preceding month shows a general increase in mean pressure from the lower Mississippi valley and the eastern slope of the Rocky Mountains westward, except on the north Pacific coast, and a decrease in pressure east of the Rocky Mountains and Texas, save in the Saint Lawrence Valley. The greatest increase in mean pressure occurred over the southern plateau region and the interior of Texas, where it was more than .05, and the most marked decrease was noted over Manitoba, where it exceeded .05.

The mean pressure was above the normal, except from the middle Atlantic coast over the lower Saint Lawrence valley, the Lake region, and the eastern part of the Dakotas, and on the north Pacific coast. The greatest departure above the normal pressure occurred over the plateau region and on the middle coast of the Gulf of Mexico, where it was .05, or more. In districts where the mean pressure was below the normal the departure was less than .05.

HIGH AND LOW AREAS.

The paths of well-defined areas of high and low pressure which appeared during the month are plotted on Charts IV and I, respectively, and some of the more prominent characteristics of the high and low areas are shown in the table at the end of this chapter.

HIGH AREAS.

Seven high areas appeared, the average number noted for August during the last 16 years being 5.7. Of the high areas traced 3 advanced from the British Northwest Territory, one was apparently an offshoot of the Pacific area of high pressure, one first appeared north of Lake Superior, one developed over the Lake region, and one, which is given a track from Texas to New England, was a subsidiary development or offshoot of the high area which advanced from the north Pacific coast. The movement of the high areas west of the Mississippi River was generally southeastward, while to the east of the Mississippi 3 of the areas moved southeastward and passed off the south Atlantic coast, 3 northeastward off the New England coast or over the Gulf of Saint Lawrence, and one disappeared north of Lake Superior. The highest pressure reported for the month was 30.44, at Dodge City, Kans., the evening of the 27th. The following is a brief description of the high areas referred to:

I.—The month opened with high pressure in the northwest and southeast districts and low pressure from the middle Mississippi valley to the Gulf of Saint Lawrence. On the 2d the pressure was high from the middle-eastern slope of the Rocky Mountains to Lake Superior, and the morning of the 3d high area I occupied the region north of the Great Lakes, whence it moved to east New England by the 4th. The morning of the 5th the pressure was highest over central New England, and on the 6th high pressure prevailed along the Atlantic coast from Nova Scotia to Florida.

II.—On the morning of the 6th two centers of high pressure appeared within an extensive area of high which occupied the country east of the Mississippi River, one being located over south Michigan, and the other over east Tennessee. By the evening of the 6th the high areas had united over the upper Ohio valley and a ridge of high pressure extended from the Ohio Valley southeast to Florida and northeast to Nova Scotia. During the next two days the high area settled south and southeast and passed off the south Atlantic coast the night of the 8th.

This area had the slowest progressive movement, 17 miles per hour, and the abnormal temperature fall during its passage was the least noted in connection with the high areas of the month. A severe thunder and wind storm occurred at Augusta, Ga., in the central part of the high area, the evening of the 7th.

III.—Advanced from the British Northwest Territory and the morning of the 11th was central north of Montana, whence it moved southeastward and disappeared off the south Atlantic coast the night of the 14th.

This area was attended by the greatest abnormal pressure change in 12 hours noted during the month, the increase for this period being .48 at Minnedosa, Man., on the 10th, and its passage was attended by light frost at Weston, Wis., on the 12th, and at South Kortright, N. Y., on the 13th.

IV.—Appeared central over Manitoba on the 14th and moved thence southeastward and passed off the south Atlantic coast the night of the 16th. Attending the passage of this high area light frost was reported at Butternut, Wis., on the 14th.

V and V*a*.—Was apparently an offshoot of the Pacific area of high pressure and the morning of the 21st was central north of Montana, whence it passed east to Wyoming by the 22d, and thence to east Nebraska. On the morning of the 23d an elongated area of high pressure extended from west Texas to Minnesota, with two centres of high pressure, one, number V, in east Nebraska, and the other V*a*, in northwest Texas. The first-named area of high moved northeast and disappeared north of the Lake region during the 24th, and the other passed east-northeast and disappeared off the New England coast during the 26th.

Attending the passage of this high area unusually cool weather prevailed between the Rocky Mountains and the Lake region. On the 21st snow was reported on the plains east of Pueblo, Colo.; on the 22d frost was reported in parts of the Dakotas, Minnesota, Wisconsin, Iowa, and Nebraska; on the 23d frost occurred in the states of the lower Missouri, upper Mississippi, and Red River of the North valleys; and on the 24th in Wisconsin, South Dakota, Iowa, and Missouri. On the 24th the temperature was the lowest ever reported for August at points in the Mississippi Valley from Iowa to Arkansas; and on the 25th there was a decided fall in temperature in Texas, and light frosts were reported in the river bottom near Denison.

VI.—Appeared central north of Montana on the 25th and moved thence to the Ohio Valley by the 28th, whence it passed northeastward and disappeared over the Gulf of Saint Lawrence the night of the 30th.

The passage of this high area was attended by cool weather from the Dakotas eastward. On the 27th the temperature was below freezing and ice and killing frost formed in parts of North Dakota; on the 28th frost was reported in south and northeast Wisconsin, and a few flakes of snow were noted at Buffalo, N. Y.; on the 29th ice was reported at Crandon, Wis., and frost in upper Michigan and the north part of lower Michigan, and on the 30th frost was reported in extreme western New York.

LOW AREAS.

In August the tracks of low areas which advance east of the Mississippi River are usually somewhat farther south than in June and July, and August storm-track charts for the last 18 years show that storms from the interior of the country do not, as a rule, pass south of the Ohio River. August marks the height of the West India cyclone season, and in August of

preceding years a number of the more destructive storms of this class have recurved over the Gulf of Mexico and the southeast part of the United States.

The tracks of 11 low areas are plotted for the current month, the average number noted for August during the last 18 years being 9.7. Of the low areas traced 2 apparently advanced from the north Pacific Ocean, 5 first appeared in the British Northwest Territory, one over the northern plateau region, one in the lower lake region, one on the southeast slope of the Rocky Mountains, and one in the middle Mississippi valley. The tracks generally converged towards the Great Lakes and the Canadian Maritime Provinces, and but one storm followed a path south of the Ohio River. The average rate of advance of the storms, 26 miles per hour, was one mile greater than the average for the last 18 years. The lowest pressure noted for the month was 29.34 at Prince Albert, N. W. T., the evening of the 18th.

From the 1st to 3d the pressure was low over the Gulf of Saint Lawrence and the lower Saint Lawrence valley, and during the 1st and 2d a low area passed northeastward along the middle Atlantic and New England coasts and thence to the west part of the Gulf of Saint Lawrence. The hurricane which devastated Martinique, W. I., the night of the 18th is referred to under the head "North Atlantic storms."

The following is a brief description of the low areas whose tracks appear on Chart I:

I.—Appeared central over the upper Mississippi valley the morning of the 1st, and moving thence slowly south of east disappeared off the middle Atlantic coast during the 4th. This was the only storm of the month whose path was south of the Ohio Valley and its course was apparently due to high area I, which moved eastward from the region north of Lake Superior to New England from the 3d to 5th.

On the 1st an area of rain extended from the Missouri and lower Mississippi valleys to the south and middle Atlantic coasts, rain fell in parts of the Lake region, the Saint Lawrence Valley, and New England, and a severe local storm was reported in Indian Territory. On the 2d rain fell in areas in the Gulf States, the middle Mississippi and Ohio valleys, and on the middle and south Atlantic coasts, and severe local storms were reported in Kentucky. On the 3d rain fell from the middle Mississippi valley to the Virginia and North Carolina coasts, and the rainfall was excessive, with heavy thunderstorms, in North Carolina. On the 4th the rain area moved off the Atlantic coast with very heavy rainfall in North Carolina, Virginia, and along the middle Gulf coast.

II.—Was central over Alberta the evening of the 3d, whence it moved eastward to Manitoba by the 5th, and by the evening of that date was central over South Dakota, whence it moved slowly northeast to the region north of Lake Superior by the night of the 8th, and passed thence eastward to the Gulf of Saint Lawrence by the 10th. The course and slow movement of this storm from the 5th to the 8th were apparently due to the presence over the south part of the Lake region and the Ohio Valley of high area II.

On the 3d light rain fell in the Red River of the North and middle Missouri valleys. On the 4th rain fell in areas in the middle Missouri valley, and heavy thunder and hail storms occurred in South Dakota. On the 5th rain fell in the upper Missouri valley, and heavy thunderstorms were reported in North Dakota, Montana, and Wyoming. On the 6th rain fell in areas in the middle and upper Missouri valleys and the Lake region, and destructive hailstorms occurred in Minnesota and North Dakota. On the 7th rain fell in the upper Missouri and Red River valleys and the upper lake region, and hailstorms were reported in Minnesota and the Dakotas. On the 8th rain fell from the upper Missouri valley over the north part of the upper lake region, in the Saint Lawrence Valley, and north New England, and heavy wind and thunder storms occurred in Michigan and Wisconsin. On the 9th the rain area extended from the upper Mississippi valley to the middle Atlantic and New England coasts, and severe thunder and wind storms occurred in the Lake region. On the 10th the weather was clearing in the middle Atlantic and New England states.

Attending the approach and slow passage of this low area exceptionally warm weather prevailed in the Northwest; the 7th was the hottest day of the season in parts of the Dakotas; on the 8th the warm wave extended to the Ohio Valley, and on the 9th over the Lake region and New York. The greatest abnormal temperature rise in 12 hours, 22°, was noted at Rapid City, S. Dak., on the 3d.

III.—Was central over Assiniboia the evening of the 9th, whence it moved southeast to North Dakota, thence northeast to the region north of Lake Superior, and thence eastward to the Gulf of Saint Lawrence where it disappeared beyond the region of observation during the 12th. This storm was apparently forced southward the early part of the 10th by high area III which occupied the country to the north and northwest of its position. During the 10th the storm moved northeastward along the southeast edge of the high area and passed rapidly eastward beyond its influence.

Rain fell in the middle Missouri and upper Mississippi valleys and in the Lake Superior region, and destructive thunderstorms occurred in Indiana, Illinois, and Iowa on the 10th. On the 11th rain fell from the lower Missouri to the upper Saint Lawrence valleys and in areas in the Atlantic coast states, and severe local storms were reported in the middle Mississippi and Ohio valleys, the Lake region, and the middle Atlantic states. On the 12th rain fell in areas in the Atlantic coast states, and heavy thunderstorms occurred in the middle Atlantic and New England states.

Following close upon and forming a continuation of the warm period noted under the description of low area II, a warm wave prevailed over the Northwest on the 9th and extended over the middle Mississippi and Ohio valleys, the Lake region, and the middle Atlantic and New England states. Exceptionally high temperature, resulting in numerous prostrations and deaths, continued over the middle Atlantic states until after the 13th, when the passage of high area III was attended by cooler weather.

IV.—Apparently developed over the plateau region and the morning of the 13th was central over South Dakota, whence it moved rapidly eastward and disappeared off the south New England coast the night of the 15th. During its passage over the central valleys on the 14th this storm was ill-defined.

On the 13th rain fell in the middle Missouri and upper Mississippi valleys and the upper lake region, and destructive local storms occurred in the regions named, except in the east part of the upper lake region. On the 14th rain fell from the middle Missouri valley over the Lake region, and local storms were reported in the lower Missouri, upper Mississippi, and Ohio valleys. On the 15th the rain area moved eastward over New England, and severe local storms occurred in the middle Atlantic states and south New England.

V and V*a*.—Apparently advanced from the north Pacific coast, and passing eastward along the north line of Montana reached North Dakota on the 15th, whence it moved to the lower Missouri valley by the 16th, where it united with V*a* which had advanced from west Kansas during the 14th and 15th. Passing east-northeast the storm-center traversed the Lake region and Saint Lawrence Valley and disappeared over the Gulf of Saint Lawrence during the 18th.

On the 14th rain fell in Wyoming, South Dakota, and Nebraska, and local storms occurred in west Nebraska. On the 15th the rain area extended from the lower Missouri valley over the lower Ohio valley, and severe local storms were reported in the regions named. On the 16th rain fell from the middle Mississippi valley to the Virginia and North Carolina coasts, and local storms occurred in the middle Mississippi and Ohio valleys. On the 17th rain and destructive local storms occurred in areas from the Lake region to Tennessee. On the 18th the weather was clearing from the middle and upper Mississippi valleys eastward, and local storms occurred in the Ohio Valley.

VI and VI*a*.—Apparently advanced from the north Pacific coast and the evening of the 17th was central over Alberta, whence it followed the usual course of storms to the Lake region by the 20th, and passed thence eastward to the Gulf of Saint Lawrence during the 21st. On the 19th an elongated area of low pressure extended from Minnesota to Kansas with a secondary center, VI*a*, in Kansas. By the morning of the 20th the secondary had moved rapidly northeastward and united with number VI in the Lake Superior region.

On the 17th rain fell on the north Pacific coast and in the middle Missouri valley. Rain continued on the north Pacific coast during the 18th and occurred in areas from South Dakota to Texas. On the 19th rain was general in the central valleys, and local storms were reported from the Lake region to Tennessee. On the 20th rain fell from the Lake region and the Red River of the North Valley to the east Gulf states, and local storms occurred from South Dakota and Minnesota over the Ohio Valley and Tennessee. On the 21st the rain area passed east of the Mississippi River, and local storms were reported in the Atlantic coast states.

VII.—Apparently developed over the southeast slope of the Rocky Mountains but was ill-defined until the morning of the 22d, when central over the Ohio Valley. The evening of the 22d an area of low pressure extended from the middle Gulf coast to the Gulf of Saint Lawrence. During the 23d the storm-center remained nearly stationary over Pennsylvania and the upper Ohio valley; by the 24th it had moved to the lower lake region, and during the 25th it apparently recurved westward and united with low area VIII, which advanced eastward north of the Great Lakes. During the presence of this storm over the lower lake region on the 24th and 25th the pressure was high along the Atlantic coast from the Gulf of Saint Lawrence southward, and this distribution of pressure apparently contributed to the recurve to the westward of this low area on the 25th.

On the 21st rain fell in the Missouri Valley, and local storms occurred from the Missouri Valley to Texas. On the 22d the rain area extended from the Ohio Valley to the Gulf and south Atlantic states, and local storms were reported in Indiana, Kentucky, North Carolina, and Georgia. On the 23d and 24th rain fell from the Lake region to the Gulf and middle and south Atlantic states, and local storms occurred in Pennsylvania and New Jersey. On the 25th rain fell in the east part of the Lake region and along the Atlantic coast.

VIII.—Appeared central north of Montana on the 23d, passed to the Lake Superior region by the 25th, and during the 26th disappeared in the direction of Hudson Bay.

On the 24th light rain fell in the Red River of the North Valley, and local storms occurred in Kansas. On the 25th and 26th the rain area extended from the Missouri Valley to the north part of the Lake region.

IX.—Appeared over the east part of the lower lake region the evening of the 27th, and passing thence along the Saint Lawrence Valley disappeared over the Gulf of Saint Lawrence the night of the 28th.

On the 27th rain fell in the middle lake region and along the Atlantic coast from Maine to Florida, and heavy local storms were reported in east New York, west Massachusetts, and Vermont. On the 28th rain fell from the Lake region over New England and the Canadian Maritime Provinces and along the Atlantic coast, and a severe storm visited Newark N. J.

X.—Appeared north of Montana the evening of the 27th, and passed thence to the Lake region, where it apparently dissipated during the 30th and 31st.

On the 28th rain fell in the Red River of the North Valley. On the 29th rain fell in the west part of the Lake region, and thunder and hail storms were reported in east and northeast Iowa. On the 30th rain fell in the Lake region and Ohio Valley, and thunderstorms were reported in Michigan. On the 31st rain fell in the east part of the Lake region, in New England, and on the middle Atlantic coast.

XI.—Appeared north of Montana on the 29th and passed thence slowly eastward to Manitoba, where it was central at the close of the month.

No rain attended this low area until the 31st, when small areas of rainfall appeared in south-central Montana and west South Dakota.

Tabulated statement showing principal characteristics of areas of high and low pressure.

Barometer.	First observed.			Last observed.		Duration.	Velocity per hour.	Maximum pressure change and maximum abnormal temperature change in twelve hours and maximum wind velocity.								
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Station.	Rise.	Date.	Station.	Fall.	Date.	Station.	Direction.	Miles per hour.	Date.
High areas.		°	°	°	°	*Days.*	*Miles.*		*Inch.*			°					
I	3	49	85	44	72	2.0	25	Albany, N. Y.	.22	3	Yarmouth, N.S.	13	5	Block Island, R. I.	e.	22	4
								Boston, Mass.	.22	3							
II	6	43	83	34	76	2.5	17	Detroit, Mich.	.10	6	Lynchburgh, Va.	7	6	Augusta, Ga.	se.	40	7
											Charlotte, N.C.	7	7				
III	11	50	108	34	75	3.5	26	Minnedosa, Man.	.48	10	Minnedosa, Man.	17	10	Huron, S. Dak.	w.	12	11
IV	14	51	95	31	80	2.5	30	do	.22	14	Sioux City, Iowa.	11	14	Chicago, Ill	e.	10	15
V	21	51	114	53	85	3.0	31	Calgary, N. W. T	.34	21	Denver, Colo	27	21	Rapid City, S. Dak.	nw.	26	21
								Abilene, Tex.	.34	22							
Va	23	34	101	43	71	3.0	24	Buffalo, N. Y.	.30	25	Abilene, Tex.	21	22	Kitty Hawk, N.C.	sw.	36	25
VI	26	51	107	47	63	4.5	28	Swift Current, N. W. T.	.32	25	Fort Assiniboine, Mont.	14	25	Bismarck, N. Dak.	nw.	26	26
								Father Point, Quebec	.32	29							
Mean						3.0	26		.28			16				25	
Low areas.									Fall.			Rise.					
I	1	40	90	38	76	3.0	14	Montgomery, Ala.	.14	1	Augusta, Ga.	8	2	Abilene, Tex	w.	48	1
II	3	51	114	49	70	6.5	18	Calgary, N. W. T.	.42	3	Rapid City, S. Dak.	22	3	Custer Station, Mont.	se.	48	3
III	9	52	104	49	65	2.5	32	Custer Station, Mont.	.28	9	Father Point, Quebec	12	11	New Haven, Conn.	w.	40	12
								Father Point, Quebec	.28	11							
IV	13	43	102	42	70	2.5	28	Swift Current, N. W. T.	.32	12	Keokuk, Iowa.	14	14	Valentine, Nebr.	sw.	42	13
V	14	49	112	45	78	3.5	23	Calgary, N. W. T.	.24	14	Pierre, S. Dak.	17	15	Huron, S. Dak.	nw.	44	17
VI	17	53	118	48	72	3.5	26	do	.46	17	Custer Station, Mont.	18	18	*Fort Canby, Wash.	s.	48	17
VII	22	38	86	47	79	3.5	17	Saugeen, Ont.	.20	24	Rochester, N. Y.	9	24	Chicago, Ill.	ne.	48	23
VIII	23	52	110	48	86	3.0	17	Qu'Appelle, N. W. T.	.40	23	Calgary, N. W. T.	17	22	Huron, S. Dak.	se.	32	24
IX	27	44	78	48	69	1.0	25	Buffalo, N. Y.	.20	27	Boston, Mass.	11	28	†Buffalo, N. Y.	sw.	42	28
								Toronto, Ont.	.20								
X	27	52	107	46	87	3.0	17	Swift Current, N. W. T.	.38	27	Fort Assiniboine, Mont.	20	27	Alpena, Mich.	se.	30	29
XI	30	52	110	51	100	1.0	15	Calgary, N. W. T.	.38	29	Bismarck, N. Dak.	19	30	Helena, Mont.	sw.	30	30
														Moorhead, Minn.	se.	30	31
Mean						3.0	21		.31			15				41	

*82, sw., Green Mountain, Me., 21st; 80, w., Mount Washington, N. H., 21st. †52, w., Mount Killington, Vt., 28th.